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# After Animas river spill, experts warn of next disaster: 'We were lucky this time'

Colorado mining spill that dumped 3 million gallons of toxic waste and turned river orange was the result of what industry experts call 'a ticking time bomb'

The Animas river, which flows through Santa Rita Park, usually bustling with river activities, is left barren as it recovers from last week's Gold King Mine spill in Durango, Colorado. Photograph: Hanna Maddera/Reuters

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The mustard-tinged cloud of toxic wastewater that last week colored Colorado's Animas river an unappealing tangerine was not the first spill to dye the river – nor is it likely to be the last, according to engineers, if government and private industry fail to take action as they have in the past.

One expert called the mines north of Durango near Silverton and the abandoned mining town of Gladstone "ticking time bombs". Another expressed relief that the Gold King spill was not larger – if a slurry of mine waste known as tailings had spilled from the area, he said, there could have been "100 times the volume" of waste.

Mark Gibson, the principal engineer at the environmental regulatory consulting company Kyklos Engineering in Denver, said the industry has expected a big blow-out like this for years.

"Most of us in the industry have been predicting this for 30 years," said Gibson. "It's basic physics. Where is the water going to go?"

The Gold King mine burst open 5 August when the US Environmental Protection Agency (EPA) was investigating ways to insert a drainage pipe into the mine, part of a larger project to clean up the nearby Red and Bonita mine. Somehow, the EPA burst the dam made of old timbers and soil, sending three million gallons of wastewater into Cement Creek.

That sent fluorescent yellow water with the acidity of coffee cascading into the dead creek, and then into the Animas, where it passed through the heart of Durango.

The color, obvious pollution, and lack of information about impact left residents, who rely on the river for drinking water, crop irrigation, livestock watering and tourism, reeling.

Acid mine drainage, as the yellow water that flowed into the Animas is known, is the result of water flowing through the mine tunnel. The chemical reaction between metals such as pyrite, oxygen and water lower the water's pH, forming a kind of sulfuric acid.

What makes this kind of waste particularly nasty is how mineral deposits in the mines react with it – heavy metals such as cadmium, lead and arsenic dissolve in acidic water, making it a doubly noxious cocktail of acid and dangerous metal.

It's this sort of waste that some experts, and Gold King's owner, claim could be filling the swiss-cheese network of mining tunnels that have carved mountains in and around Silverton, presenting the possibility of a larger spill in the future.

## 'Disaster was going to occur'



Heavy metals discolor the water near Baker's Bridge north of Durango, Colorado. Photograph: Jeremy Wade Shockley for the Guardian

At Gold King, it's hardly the first warning that the mine could have a "blow-out".

"We were lucky this time," said Gold King mine owner Todd Hennis, who believes that a large pool of water behind his mine will continue to discharge, potentially in an even larger blow-out. "I have been telling people quite vocally for 14 years: the Sunnyside mine pool would only get worse, more adjoining properties would see discharges from their lands, and that at some point a disaster was going to occur."

Hennis blames the concrete plugs or "bulkheads" installed by neighboring mine owner Sunnyside Gold Corporation, a subsidiary of $3.8bn Canadian mining conglomerate Kinross Gold.

Sunnyside Gold Corporation operated a water treatment plant on the site for years, purifying acid mine drainage from the nearby American Tunnel. But the mine operator and the state reached an agreement with Colorado in 1994 to remediate several other mine sites, and hand over operation of the water treatment plant to Gold King's then-owners, freeing Sunnyside's owners from perpetual operation of the water treatment plant, according to reporting from a senior editor at High Country News.

Soon after, Gold King's owners found themselves in financial trouble and the water treatment plant closed. Sunnyside's owners installed money-saving 12ft-thick concrete plugs at the mine, which have stopped up the water in mines near Silverton. At this point, Hennis said output at his mine began to increase from seven gallons per minute before the bulkheads to 250 gallons per minute by 2012, to 610 gallons per minute after last week's release.

The company that previously owned the Gold King, Colorado Goldfields Incorporated (which Hennis was also involved with), knew about the increased drainage as early as 2000, and warned of a "blow-out" in a 2008 Securities and Exchange Commission filing. Still, the Goldfields was never able to prove where the water was coming from.

"[The concrete plugs impound] billions and billions of gallons of water," said Hennis. "If those bulkheads were to rupture for any reason, instead of having one day of water flowing past Durango that's blood orange, we would have months and months."

Kinross Gold Corporation, which owns Sunnyside, would not make anyone available to comment for this story. In a prepared statement, the company wrote: "Since Sunnyside's closure in 1991, the company has met all its regulatory environmental requirements and has complied with all the terms of its reclamation permit."

Asked about the bulkheads, EPA regional emergency response director David Ostrander told reporters on Friday: "We don't really know what the effect has been."

"The conditions up there are very complex," Ostrander said. The EPA refused to comment on connections between mines at the site, or the possibility that more water is backed up behind other mines in the area on Saturday, saying Ostrander was not on the call and thus could not comment.

"There's extensive mining workings underground. The connections between various mines from a water standpoint is not well understood at this point and so we don't really know if we can say water is coming from here or there," he said.

Other experts echoed Ostrander's statements.

"You have 100 years of underground mine workings, mine space, with an unknown amount of water coming in. You have – you don't even know all the mine workings because it's not all documented," said Ron Cohen a civil and environmental engineer with the Colorado School of Mines. "You can't send anybody down there – you only can go so far before it becomes too risky."

Bill Simon, coordinator of Animas River Stakeholders Group (ARSG), a cooperation between community members and local businesses including Sunnyside and other mining companies that has resisted superfund designation of the Gold King, agreed about the possibility of flowing contamination. But he said it's impossible to say how much water is behind Gold King without going into the mine.

"It is possible," said Simon. "You just don't know until you go in."

## A history of accidents

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Mike Wright and Mike Carruthers clear away debris from the Stacey Ditch in Aztec, New Mexico. Federal officials say initial tests on sediments collected downstream of a mine waste spill show no risk to people using Colorado's Animas river. Photograph: Jon Austria/AP

Local officials reopened the Animas river to recreation on Friday, warning residents to bathe and wash clothes after coming into contact with the water, and not to drink it untreated. On Saturday, irrigation ditches were being flushed of orange sediment. The EPA is delivering 100,000 gallons of water per day to farmers in the Navajo Nation alone.

Data released by the EPA found the river reaching "pre-incident" levels, but that may not be comforting to some: hundreds of gallons of acid mine drainage have seeped into the Animas from Cement Creek for decades. Cement Creek has not supported fish life for at least 100 years, according to some experts.

The chemical reactions caused by acidic water decrease as the water is diluted with more neutral water, such as when it flowed downstream into the Animas. The dilution normalizes pH, causing metals to fall out of the water column and into sediment, accounting for the relatively quick passage of the 3 million gallons of colored water.

Blow-outs are not uncommon in the Animas basin, said Simon. There have been five notable releases since he started the ARSG in 1994, and more decades earlier.

Mining accidents, apart from blow-outs, are not uncommon in the area. In one incident in 1974, miners accidentally dumped 100,000 tons of gray tailings into the Animas river, turning the river silver by some accounts and washing away part of a highway. In an incident in 1978, mining at Sunnyside weakened the bed of Lake Emma until the mine collapsed, the Durango Herald reported.

Far from being the only mine with such issues, Gold King is one of many, often with dams pre-

dating environmental regulations that could be rotting away.

"This is not the only problem at these sites, in terms of these spills," said Cohen. A tailings spill, for example, could release "100 times the volume of the Gold King [spill]".

"Given that information, the longer we wait to deal with this problem, with the temporary measures that we do [have], the more these are going to occur," said Cohen. "We're looking at a not very promising future, so, in that, I'm an alarmist, based on my knowledge."